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ABSTRACT

An investigation of the short term stability of infants' responses to strangers was conducted. Ss were 60 randomly chosen full-term family-reared infants, 30 boys and 30 girls, selected to fit into three age groups of 8, 10 and 12 months. The experimental design was such that the order of first, second, and third visits was counter-balanced between experimenters. During the meeting, the S, who was at his feeding table, was observed for facial expression, visual and vocal behavior, as well as his gestures and movements. Every action and expression was scored as Positive, Negative, or Undifferentiated. Results indicate that the majority of the children at the ages investigated have achieved the perceptual, cognitive, and emotional ability to respond differentially to various individuals, and to respond negatively under certain conditions. (CK)

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# Short Term Stability of Infants Responses to Strangers

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This paper is concerned with an investigation of the short term stability of infants responses to strangers. The issue of the stability of the response has seldom been raised in the literature pertinent to the reaction of children to strangers. On the contrary, the majority of the hypotheses and theories advanced to explain the reaction do not raise the question of stability. Furthermore, many of the research investigations which have led to statements concerning the characteristics and determinants of reactions to strangers were made on the basis of a one-visit experiment. Correlation studies relating the negative reaction to other factors - other fears in early childhood, to later shyness, or fear, to object permanence, to causality and to motor development - were also done on the basis of one visit. The unstated assumption in these studies, as well as in some longitudinal studies wherein subjects were visited at three to four week intervals is that the reaction that a child exhibits to an investigator on the day of the investigation is that child's consistent response to strangers for that period of his life. A response on a particular day is presumed to represent what it would have been the day before or the day after the investigation. Furthermore most of these researchers neglect the identity of the particular stranger .

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[1] This paper was read at the 1973 meeting of the Society for Research in Child Development at Philadelphia, Pennsylvania. The research was supported by the Canada Council.

At this time there exists some controversy as to the universality of the fear of strangers whether, as has been generally accepted, it is a normal and necessary adjunct of child development or whether it even exists at all. The controversy stems in part from the difference in the number of children reported as reacting negatively by various researchers. The range extends from 95% negative to less than 1%.

Further a review of the literature reveals many discrepancies in the findings of major research projects about age, sex, and social experiences and reactions to strangers. There is a lack of evidence for a theoretically necessary relationship between certain cognitive functions and the reaction to strangers. There has also been found a lack of relationship to motor development.

In order to verify the stability of the response to strangers, we proceeded as follows.

## Procedure

### Subjects

The subjects were 60 randomly chosen full-term family-reared infants, 30 boys and 30 girls. They were chosen to fit into three age groups of 8, 10 and 12 months.

### Experimenters

Three experimenters, two females and one male, each made one home visit to each child. The experimental design was such that the order of first, second, and third visits was counter-balanced between experimenters.

Design

The child was visited three times within 12 days. Thirty-three subjects were seen on three consecutive days and only one subject had as long a delay as ten days between visits.

The child was approached in four phases, sight, near, physical contact and holding. Although the phases were structured and timed, the experimenter smiled and spoke and reacted to both baby and mother as naturally as possible throughout the approach. The approach was based on our 1972 study of the natural approach of a stranger to a child.

Arrangements with the mother

The subject was seen in his feeding table. The mother was seated immediately beside and slightly towards the back of the feeding table.

During a five minute period, the unseen experimenter stationed himself in a position where he could overhear the mother-child interaction in order to be sure that the child was in a good mood. This having been established, the experimenter entered the room and initiated the four-phase approach.

During the approach, the subject's facial expression, visual and vocal behaviour, as well as his gestures and movements, were recorded on tape when evident during every 15 second interval.

Analysis of results

Every action and expression seen or heard was scored as Positive, Negative, or Undifferentiated. Classification was based both on the

classification used in earlier studies by Morgan and Ricciuti (1969), Goulet (1972) and Brossard (1972) and on unanimous agreement between the three experimenters.

However, all behaviour was scored according to the context in which it occurred.

Evaluation of the Affect and Affect Intensity Scores.

Interval score

The Affect Score for each 15 second interval was determined by examining the distribution of three possible Affect Scores, P, N or U, given for each action. Where the actions in the interval each received the same Affect Score (for example N) the score for interval was that affect (N). Where the actions did not share the same Affect Score and the differences lay in the presence of one of the two determined scores (P or N) and one or more U scores, the interval was scored P or N, the clear affect carrying more weight than the indifferentiated. Where the difference lay in the presence of the two determined scores, P and N, the interval was scored U the undifferentiated score subsuming vacillation.

At this point an Intensity Score was joined to the Affect Score. In order to arrive at an interval score for the intensity of the shown affect three levels of intensity were determined: the score of 1 was attributed for low affect; 2 for moderate affect and 3 for accentuated affect. Both quality and quantity of affect were used as criteria, and scores accorded as follows:

1 was given if the interval contained no more than one positive action. For example: a single smile.

2 was given if the interval contained two or more positive actions. For example: a smile and a vocalization. It was also given for one continuing positive action. For example: a constant smile.

2 was given if the interval contained two or more positive actions directed solely towards an object belonging to E. For example: playing with and smiling at E's microphone.

3 was given if the interval contained very enthusiastic, spontaneous or reactive friendly interactions with E. For example: participating in a game with E, accompanied by broad smiles and chuckles.

-1 was given if the interval contained one negative action. For example: a withdrawing of the hand.

-2 was given if the interval contained two or more negative actions. For example: a whimper and a cry face.

-3 was given if the interval contained a very negative reaction. For example: screaming and crying.

0 was given if the interval contained U-scored actions only.

Phase and General Response Scores were obtained by an albebraic summation of the interval intensity Scores.

Determination of stability

In order for a child's general response to strangers to be considered stable he had to meet two requirements. First, he had to receive the same Affect Score at each visit and thus arrive at a score in P, P, P, or N, N, N, for the three visits. The second requirement for obtaining a stable evaluation

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was that the child had to arrive at his repeated Affect Score in a similar fashion at each visit. Where the evolution of one GRS was essentially different from the evolution of another GRS the response was considered unstable.

## Results

### Stability of the General Response

The General Response Scores (GRS) of 51 subjects were used in the evaluation comparing stability to instability. Nine subjects had to be excluded from the stability-instability comparison.

The stability for the sample as a unit is highly significant ($p < .01$, binomial, one-tailed test). As can be seen in Table 1, there were 25 children 17 boys and 8 girls who had stable scores. There is a significant sex difference ($p < .05$; Fisher's exact probability test). Further analysis of the

Table 1

Number of stable and unstable subjects divided according to age and sex group (N=51, p=.25)

| Group | Sex | N | Stable | Unstable | p |
|---|---|---|---|---|---|
| 8 month | F | 9 | 4 | 5 | > .05 |
| | M | 9 | 6 | 3 | < .01 |
| 10 month | F | 8 | 1 | 7 | > .05 |
| | M | 9 | 4 | 5 | > .05 |
| 12 month | F | 8 | 3 | 5 | > .05 |
| | M | 8 | 7 | 1 | < .001 |
| Total | | 51 | 25 | 26 | < .001 |

stability data reveals that the main sources of the sample stability are the 8 and 12 month old boys. The number of stable 10 month old boys is too low to consider the group stable. The analysis of stable responses in the respective groups of 8, 10 and 12 month old grils showed too low a frequency for any of those groups to be considered stable.

Relationship between stability and affect.

Amongst the stable subjects there were found two categories of infants, those who reacted negatively and those who reacted positively. The total number of positive stable children is significantly greater than the total number of negative stable children ($p < .02$, binomial two-tailed test).

Table 2

Stable children divided into positive and negative categories (N=25, P= .50)

| Group | Sex | N | Positive | Negative | p |
|---|---|---|---|---|---|
| 8 month | F | 4 | 3 | 1 | $<.05$ |
| | M | 6 | 6 | 0 | $<.05$ |
| 10 month | F | 1 | 0 | 1 | $<.05$ |
| | M | 4 | 3 | 1 | $<.05$ |
| 12 month | F | 3 | 2 | 1 | $<.05$ |
| | M | 7 | 5 | 2 | $<.05$ |
| Total N | | 25 | 19 | 6 | $<.02$ |
| Percentage | | | 76% | 24% | |

The analysis of positive and negative stable responses in the respective age-sex groups showed the eight month old boys to be positive stable ($p < .05$, binomial, two tailed test). The 12 month old boys show the same

trend although the numbers do not reach significance. In the ten month old boys groups and in the three girls groups the numbers of stable positive or stable negative Ss are not significant. Nonetheless the data illustrates the greater variability of the negative response to the stranger.

Intensity of the response

The possible scores ranged score from + 33 to 0 to -33. The mean intensity scores for the three visits for each group were as follows:

8 month old girls, 7.20;

10 month old girls, 1.67;

12 month old girls, 2.13;

8 month old boys, 9.03;

10 month old boys, 6.53;

12 month old boys, 6.03.

As was expected, variations in the intensity of the affect shown by the individual subjects was found. Tables 3 and 4 expose the difference between the two most extreme scores of each child's three GRSs.

The majority of the 26 children that constitute the unstable group exhibited a change in intensity of affect which resulted in a change in score of a minimum of ten points. Amongst these 14 had a score difference of over 19 points. The wide individual discrepancy in the response of those in the unstable category could suggest that variability is characteristic of their instability. However, it was found that almost half the 25 stable children (including three stable negative) showed a variableness in affect that changed their scores ten points or more from visit to visit. Although they remained

stable within the limits of a Positive or a Negative attitude, they altered their behaviour noticeabley in response to different strangers on different days.

As to within visit stability, using the three day intensity scores we found a significant sex by phase interaction difference between the sexes, with the boys generally remaining both stable and positive, and the girls becoming decreasingly positive in response to the increasing physical contact imposed by the stranger.

We also found both boys and girls to be significantly more negative to the male stranger, whereas there was no difference in the mean reaction to the two female strangers. These results are in accordance with those found by Benjamin (1961), Morgan and Ricciuti (1969) and Lewis and Brooks Gunn[1].

## Discussion

This investigation has revealed that within a twelve day period a significant number of infants are stable in their responses to strangers, but this result must be carefully nuanced because the stability is significantly related to a positive response.

Since it is the negative response to strangers which has received the greatest attention from investigators, and since it is the negative response which has by and large been considered the normative response, the finding that only one sixth of the subjects consistently responded negatively appears of prime importance.

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[1] Lewis, M., Brook-Gunn, Jeanne (1972). Self, other and fear. The reaction of infants to people. Research bulletin from the Educational testing service. Princeton, New Jersey.

Instability of the negative response and theoretical explanations of fear of strangers.

The finding that the negative response is unstable raises serious questions in relation to the major theories purporting to explain the fear of strangers. With reference to Spitz's (1950) theory, is it conceivable that the child who was negative to a stranger on day one, thus proving the existence of an object relation with his mother and his fear of losing her, lost the relationship and the concomittant anxiety on days two and three when he was positive? Or can it be thought that the child who was positive on day one and negative on day two developed an object relation and anxiety in the intervening hours only to have lost them again as shown by his positive response on day three?[1]

With reference to the theory that the fear of strangers is innate and analogous to the flight response in animals (Freedman 1961, Gray 1958) it appears difficult to maintain the analogy in the face of the variability of the negative response. Do animals who flee members of enemy species alternate fear and acceptance responses within a period of one day or even a few days? Similarly Bowlby's (1969, p. 324) statement that infants naturally come to fear strangers simply because they are strange becomes open to question if the same child alternately gives positive and negative responses to equally strange strangers (equal in that the child has never before seen any one of the three visitors).

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[1] We are not implying that the achievement of the ability to distinguish between familiars and strangers, to express different emotions to them and to experience separation anxiety is not an important development. The question is whether a fearful response to strangers is the necessary proof of sufficient ego development to form an object relation.

With reference to Hebb's (1946) theory that fear is the result of the contrast between a novel visual percept and a learned internal pattern for the familiar, can the resultant emotional conflict occur on certain days and not on others? And, if so, under what conditions will a conflict take place and fear be manifested? If the degree of familiarity is the determinant, as has been suggested by Hunt (see Schaffer, 1966) Mussen et al. (1969) and Kagan (see Schaffer, 1971), the negative response would then be a function of the particular bearing of certain strangers and not a response to strangers in general.

With reference to Székely (1954), can a child's perception of a face other than the face associated with need gratification produce fear on one day and not on the preceeding or following days? The variability of the fear response appears to indicate that the stated stimulus falls short of the requirements for releasing an innate fear release mechanism.

The instability of the negative reaction also raises grave questions about predicting the quality of ego functions (Spitz 1965) or later pathology (Benjamin 1961, Bronson, 1970, Spitz 1965) based on positive or negative responses during one or several widely spaced observations at a given age period.

While the results of this research raise questions about theoretical issues and about predictions of future personality characteristics, they explain the incidence of stranger response instability reported in the literature. They also contribute an explanation for the variable research results.

Age of onset and age of maximum intensity

Negative response instability explains the diversity in the research reports concerning the age of onset of fear of strangers[1]. It is evident that children who sometimes respond negatively to strangers may be positive to the observer on the day of the investigation, thus masking the age of onset of negative responses. Similarly, the moment of maximum intensity of the negative response is masked, not only by a positive response from a child who can be intensely negative but by the day to day variation of the intensity of the negative response.

Correlational studies

Given the degree of instability in the response to strangers, it is not surprising that Scarr and Salapatek (1970) and Brossard (1972) found positive and negative infants in both earlier and later stages in the development of object permanence.

Nor is it surprising that Goulet (1972) found both positive and negative responses amongst infants who were at different stages in the development of causality. Negative response instability explains the observed non-correlation between motor development and stranger reactions, (Scarr and Salapatek, 1970; Duguay, 1972) and between investigators' lack of agreement about the role of social experience in the stranger response.[2]

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[1] This is not to say that other factors, such as the approach and the criteria for scoring fear, do not also contribute an explanation.

[2] This is seen in comparing Schaffer (1966), Collard (1968), Morgan and Ricciuti (1969), Beckwith (1972) and Duguay (1972).

Universality of the negative response.

The instability of the negative response helps to explain the reports of varying numbers of negatively reacting children for any one visit. The variability of the response would naturally lead to a random number of children reacting negatively on a given day. However, neither the variability of the negative response, nor the short term stability of the positive response clarify the basic issue of whether the negative response is universal. Proponents of the view that the fear response is a normal developmental phenomenon could argue that the positive stable response was seen in infants who had already lived or were still to arrive at their fear of strangers phase.

Age and sex differences.

This experiment has revealed both age and sec differences in the stability of the response to strangers. Whereas boys are significantly more stable and positive than girls at eight months and show the same trend at 12 months, the stability breaks down in the ten month group. The peak in attachment occuring at ten months (Schaffer and Emerson, 1964) and coinciding with the loss of the feeling of omnipotence (Escalona, 1953) could lead to an increase in separation anxiety in the child. Heightened separation anxiety could occasion a rise in negative responses to strangers (Ainsworth, in press) and would explain the breakdown in positive stable responses in the 10 month old boys.

Why are the girls unstable? There are some hints in the literature. Kagan (1971) found a stable disposition to become irritable when bored, in 8 to 13 month old girls. Goldberg and Lewis (1969) found girls more dependent

on, and seeking more proximity to the mother, than boys. Mothers apparently encourage this closer relationship with girls (Kagan 1971, Goldberg and Lewis 1969). Both the irritability and the closer relationship to the mother might occasion a greater alternation between responses of interest and attraction for novelty, and resentment against intrusion into the mother-child relation in girls (We have often seen resentment of this intrusion directed to the child's father).

Since Goldberg and Lewis (1969) report that mothers of boys touch and handle boys less than do mothers of girls, the significant sex by phase interaction showing the boys as much more positive to touch and to being picked up may be interpreted as reflecting a need and appreciation for physical contact in the boys.

The findings emphasize that further investigation in the area of infants responses to strangers will require separate analyses on the basis of sex. However, because of the varying nature of the response to strangers, we feel that our findings of particular age and sex differences in affect and stability will require replication before they can be generalized.

Our data indicate that the majority of children at the ages investigated have achieved the perceptual, cognitive, and emotional ability to respond differentially to various individuals, and to respond negatively under certain conditions. Whether the negative response is fear, and whether a fear response to strangers is a normative response, still awaits both a practical consistent definition of fear, and a well controlled multi-visit longitudinal study.

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1 International Universities Press (in press)

Table 3

Range of intensity of affect as measured by the difference between the two most extreme scores obtained by the unstable subjects (possible range=67 points)

| Group | Degree of Change | | | | | N |
|---|---|---|---|---|---|---|
| | Moderate 1 to 9 points N= | Substantial 10 to 18 points N= | Major 19 to 27 points N= | Striking 28 to 33 points N= | Extreme over 33 points N= | |
| 8 month old girls | 1 | 2 | | 1 | 1 | 5 |
| 8 month old boys | 1 | | | | 2 | 3 |
| 10 month old girls | | 5 | 1 | 1 | | 7 |
| 10 month old boys | | 2 | 2 | 1 | | 5 |
| 12 month old girls | | | 3 | 2 | | 5 |
| 12 month old boys | | 1 | | | | 1 |
| Total | 2 | 10 | 6 | 5 | 3 | 26 |

Table 4

Range of intensity of affect as measured by the difference between the two most extreme scores obtained by the stable subjects (possible range=33 points)

| Group | Degree of Change | | | | N |
|---|---|---|---|---|---|
| | Moderate 1 to 9 points | Substantial 10 to 18 points | Major 19 to 27 points | Striking 28 to 33 points | |
| 8 month old girls | 2 | 1 | 1 | | 4 |
| 8 month old boys | 3 | 1 | 1 | 1 | 6 |
| 10 month old girls | 1 | | | | 1 |
| 10 month old boys | 3 | 1 | | | 4 |
| 12 month old girls | 2 | | | 1 | 3 |
| 12 month old boys | 3 | 4 | | | 7 |
| Total | 14 | 7 | 2 | 2 | 25 |

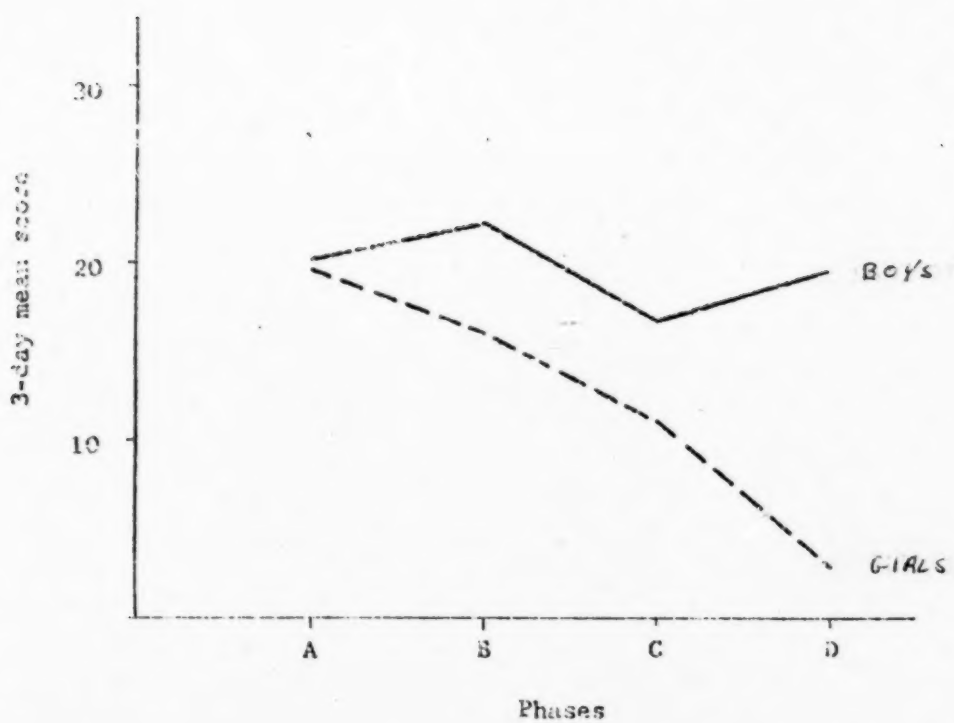


Fig. 1 - Graphical representation of the significant sex by phase interaction.